Research Report 1352

(12)

DEVELOPMENT OF PREDICTORS OF PERFORMANCE UNDER STRESS IN JUMPMASTER TRAINING

AD A140177

William P. Burke

ARI FIELD UNIT AT FORT BENNING, GEORGIA

DTIC FILE COPY

DTIC ELECTE S D APR 17 1984 E

U.S. Army
Research Institute for the Behavioral and Social Sciences

July 1980

Approved for public release; distribution unlimited.

84 04 17 007

U. S. ARMY RESEARCH INSTITUTE
FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the

Deputy Chief of Staff for Personnel

JOSEPH ZEIDNER
Technical Director

L. NEALE COSBY
Colonel, IN
Commander

NOTICES

DISTRIBUTION: Primary distribution of this report has been made by ARI. Please address correspondence concerning distribution of reports to: U.S. Army Research Institute for the Behavioral and Social Sciences, ATTN: PERI-TST, 5001 Eisenhower Avenue, Alexandria, Virginia 22333.

FINAL DISPOSITION: This report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: The findings in this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER: Research Report 1352	2. GOVT ACCESSION NO.: AD-A140127
	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle): DEVELOPMENT OF PREDICTORS OF PERFORMANCE UNDER STRESS IN JUMPMASTER TRAINING	5. TYPE OF REPORT & PERIOD COVERED: --
	6. PERFORMING ORG. REPORT NUMBER: --
7. AUTHOR(s): William P. Burke	8. CONTRACT OR GRANT NUMBER(s): --
9. PERFORMING ORGANIZATION NAME AND ADDRESS: US Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue, Alexandria, VA 22333	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 2Q263731A792
11. CONTROLLING OFFICE NAME AND ADDRESS: U.S. Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue, Alexandria, VA 22333	12. REPORT DATE: July 1980
	13. NUMBER OF PAGES: 42
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): --	15. SECURITY CLASS. (of this report): Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE: --

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

--

18. SUPPLEMENTARY NOTES

--

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Jumpmaster training
Performance under stress
Prediction of performance under stress
Sports participation

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Questionnaires asking about background and jump experience, sports participation, and reaction to stress were given to 128 men from four consecutive classes of students from the Jumpmaster Training Course at Fort Benning, Georgia, during 1979 and 1980. Using multiple regression, measures from those questionnaires were employed to develop predictors of performance under stress during training. This research identified variables from each questionnaire which are potentially useful predictors of points scored during (Continued)

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Item 20 (Continued)

stressful training jumps in the course. These included age of student, number of previous parachute jumps, amount of stress experienced during training jumps, and the individual's history of prior sports participation.

This research was exploratory in nature and the results should be considered to be tentative. Due to the unavoidably low subject-to-variable ratio in this research, some shrinkage in the predictive power of these variables can be expected beyond that already adjusted for statistically in the analyses.

Research Report 1352

DEVELOPMENT OF PREDICTORS OF PERFORMANCE UNDER STRESS IN JUMPMASTER TRAINING

William P. Burke

Accession For
NTIS GRA&I [X]
DTIC TAB [ ]
Unannounced [ ]
Justification
By
Distribution/
Availability Codes
Dist | Avail and/or Special
A-1

DTIC COPY INSPECTED

Submitted by:
H.C. Strasel, Chief
ARI FIELD UNIT AT FORT BENNING, GEORGIA

Approved by:
E. Ralph Dusek, Director
TRAINING RESEARCH LABORATORY

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES
5001 Eisenhower Avenue, Alexandria, Virginia 22333

Office, Deputy Chief of Staff for Personnel
Department of the Army

July 1980

Army Project Number
2Q263731A792

Manpower and Personnel

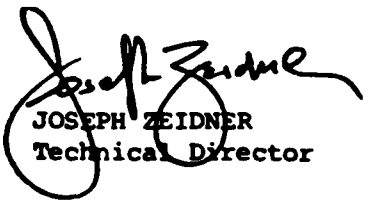
Approved for public release; distribution unlimited.

ARI Research Reports and Technical Reports are intended for sponsors of R&D tasks and for other research and military agencies. Any findings ready for implementation at the time of publication are presented in the last part of the Brief. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or Disposition Form.

FOREWORD

The US Army Research Institute (ARI) Field Unit at Fort Benning, Georgia, is strategically located at one of the centers of airborne training for the United States military and has ready access to numerous individuals who are undergoing the stresses of parachute jumping and related activities. This report describes basic research to develop variables predictive of performance under stress in the Jumpmaster Training Course at Fort Benning.

Understanding the relationships explored here is fundamental to the development of selection programs to identify soldiers for stressful or hazardous duty. The data described in this report will be of interest to agencies charged with that responsibility.



JOSEPH ZEIDNER
Technical Director

ACKNOWLEDGEMENTS

This research was made possible by the generous cooperation of the Director of the Airborne Department at Fort Benning, COL Joseph A. Villa. Special assistance to this project was provided by CPT Fred Berger and MAJ Steven Pullen, each of whom served in his turn as Operations Officer of the Airborne Department. Invaluable support and assistance were provided by SFC Joe Wood, Chief of the Jumpmaster Training Branch, and his cadre of Jumpmaster instructors.

DEVELOPMENT OF PREDICTORS OF PERFORMANCE UNDER STRESS IN JUMPMASTER TRAINING

EXECUTIVE SUMMARY

Objective:

To develop predictors of performance under stress in Jumpmaster training by determining whether performance during the more stressful events of the Jumpmaster Course can be predicted from the personal and military background of students and their history of prior sports participation.

Procedure:

Questionnaires asking about background and jump experience, sports participation, and reaction to stress were given to 128 men from four consecutive classes of students from the Jumpmaster Training Course at Fort Benning, Georgia, during 1979 and 1980. Using multiple regression, measures from those questionnaires were employed to develop predictors of performance under stress during training.

Findings:

This research identified a number of variables from each questionnaire which are potentially useful predictors of points scored during stressful training jumps in the course. These included age of student, number of previous parachute jumps, amount of stress experienced during training jumps, and the individual's history of prior sports participation.

Utilization of Findings:

It is necessary that the results obtained in this research be cross-validated on an independent sample of individuals to see if the variables and equations developed here can be used to predict the performance scores and graduate status of future students. The unavoidably low subject-to-variable ratio in this research suggests that some shrinkage in predictive power should be expected. However, if these findings are essentially replicated by further investigation, it will be possible to predict a substantial portion of the variance in performance during the Jumpmaster Course with quickly administered and inexpensive questionnaires. A significant amount of the variance in performance accounted for in this research is predicted by variables from the Sports Participation Questionnaire which reflects an individual's history of involvement in sports.

It is possible that these variables tap into a generalized ability to perform under stress. To the extent that the questionnaire is ultimately shown to be predictive of that ability, it could be an important addition to any battery of selection tests administered to identify men for hazardous duty.

DEVELOPMENT OF PREDICTORS OF PERFORMANCE UNDER STRESS
IN JUMPMASTER TRAINING

CONTENTS

	Page
INTRODUCTION	1
OBJECTIVES	3
METHOD	3
Research Participants	3
The Jumpmaster Training Course	3
Procedure	4
RESULTS AND DISCUSSION	7
Background Information, Prior Performance, Sports Participation, and Perceived Stress as Predictors of Performance in the Aircraft	7
Background Information, Prior Performance, Sports Participation--Level of Competence, Minus Perceived Stress as Predictors of Performance in the Aircraft	12
Sports Participation--Level of Competence--Variables as Predictors of Performance in the Aircraft	12
GENERAL DISCUSSION	17
Performance under Stress	17
Perceived Stress as a Predictor	17
Age and Jump Experience as Predictors	18
Sports Participation Predictors	18
Problems with the Research	19
The Sports Participation Questionnaire	20
REFERENCES	21
APPENDIX A. BACKGROUND AND JUMP EXPERIENCE QUESTIONNAIRE	A-1
B. SPORTS PARTICIPATION QUESTIONNAIRE	B-1
C. STRESS REACTION QUESTIONNAIRE	C-1

Page

LIST OF TABLES

Table 1. Means, ranges, and standard deviations for background information, prior performance, perceived stress, and sports participation--level of competence--variables used to predict point scores of aircraft phase of the Jumpmaster Course 9

2. Summary table of multiple regression analysis predicting point scores of aircraft phase of Jumpmaster Course from best predictors among background, performance, stress, and sports participation--level of competence--variables . . 11

3. Summary table of multiple regression analysis predicting point scores of aircraft phase of Jumpmaster Course from best predictors among background, performance, and sports participation--level of competence--variables 13

4. Means, ranges, and standard deviations for sports participation--level of competence--variables used to predict point scores of aircraft phase of the Jumpmaster Course 14

5. Summary table of multiple regression analysis predicting point scores of aircraft phase of Jumpmaster Course from level of competence in prior sports participation 15

INTRODUCTION

Attempts at the assessment of men for the purpose of predicting their performance under stress probably go back in time as far as man himself. Efforts to apply the techniques and findings of behavioral science have a much more recent history, however, and may be considered to have begun to evolve during World Wars I and II when, first the Germans, and then the Allies began to employ psychologists and psychiatrists to assess the potential of candidates for military missions involving performance under conditions of danger and stress (OSS Assessment Staff, 1948).

The verdict on the value of those efforts is not clear, however, due to the questionable validity of the measures of the actual performance of the assessees under the stress of wartime conditions (OSS Assessment Staff, 1948). It is certain that the candidates selected were sent into situations of true danger and stress; it is less certain how well they actually performed relative to predictions.

Efforts to predict and select men for performance under stress have continued and expanded since World War II (e.g., Berkhouse, 1963; Edgerton & Graham, 1951; Olmstead et al, 1972). There is an abiding problem associated with all such efforts, however, and it is especially troublesome during times of peace. One of the most notable aspects of peacetime training and assessment settings is the absence of most of the stresses associated with performance under actual combat conditions (fear, fatique, hunger, etc.). This deficiency is understandable in that it is extremely difficult or expressly unethical to subject men to these stressors except in times of national emergency. Research done in the 1950's showed that when the stressors applied to men were those of actual combat, as in the Korean War (Egbert et al., 1958), many interesting and useful attributes and background experiences were discovered that distinguished good from poor fighting men (e.g., good fighters have a past history of taking initiatives and experiencing success). However, later research, done after the war was over, demonstrated that when the stressors were obviously contrived (e.g., firing at pop-up targets in a perimeter defense while artillery and grenade simulators are detonated to the rear), one of the most frequent outcomes was that the men used as subjects rarely felt any real stress at all (Mulcahy, 1957). In other cases (Berkun et al., 1962) where individuals did actually feel stress (e.g. being told that one's actions had caused injury to others), the experimenters drew censure from their professional organization because of the ethical principles involved.

One basic problem, then, in assessing or predicting performance under stress in peacetime, is to find situations in which stress is reliably produced. The U.S. Army Jumpmaster Training Course at Fort Benning, Georgia, offers a set of relatively favorable conditions within which to develop and validate measures for the prediction of performance under stress. Performance during this course is graded by instructors in an aircraft in flight while students are under close scrutiny and extreme time pressure to complete a

series of actions and inspections, vital to the safety of other men and themselves, which prepare personnel and equipment for an airdrop.

Only a brief association with those students prior to their boarding the aircraft to make those graded training jumps is necessary to convince the observer that performance in the Jumpmaster Course is a stressful experience for most individuals. It is apparently not, however, as an observer will also notice, particularly stressful for some individuals, and that circumstance lends itself to inquiry into the differences among them which might explain the differences in their reactions to the same situations.

One measure, in particular, suggests itself at the outset as a possible predictor of those differences. Since Jumpmaster training is an airborne operation, prior experience with other airborne operations, including the number of previous parachute jumps, might be a potent predictor. However, the character of the experience changes drastically as one switches from being a jumper, a passive participant, who moves to the door and jumps at the commands of another, to being a Jumpmaster, an active decision-maker, who issues the proper commands at the proper time and who carries the responsibility to see to it that all jumps are made in a safe and timely manner.

The passive role of the jumper contrasts sharply with the active role of the Jumpmaster. To judge from the relatively large number of men with many prior jumps who have done poorly in the Jumpmaster Course, some quality of experience beyond that provided by an increase in the number of repetitions of the passive event is needed to develop the ability to operate effectively in the active mode.

If much of that qualitative change in experience is not the result of merely increasing the total number of military jumps completed, then it should be the result of either other experiences the individual has had in the military, or of experiences from his earlier life history. Prior military experience which might be predictive would be participation in other forms of military training in which performance is graded during fast-moving training events or the generally different experiences that come to those of different military ranks (e.g., Sergeants First Class as opposed to Second Lieutenants) Experiences from the individual's past life which are likely to develop attitudes and abilities of benefit in training like that in the Jumpmaster Course might come from prior sports participation. This would be most likely for those sports in which the individual must think quickly and clearly and display skillful performance while under stress from danger or from competition and the clock.

If these latter background experience variables were to prove powerful enough to predict the variability in performance measures during Jumpmaster training, beyond that predicted by airborne-specific variables (such as number of jumps), the results could be reflective of a generalized ability to perform under stress. The primary purpose of this research was to search for variables predictive of that generalized ability.

OBJECTIVES

The specific objectives of this research were:

1. Exploratory development of predictor variables of success and failure in Jumpmaster Training.

2. Exploratory development of predictor variables of performance under stress defined as performance during the graded training jumps of the Jumpmaster Course.

3. Exploratory development of a sports participation questionnaire to predict performance under stress.

METHOD

Research Participants

This research was conducted with the students from four consecutive classes of the Jumpmaster Training Course at Fort Benning, Georgia, during 1979 and 1980. There were a total of 128 individuals, all male, in the study, ranging in rank from Captain, 03, to Private First Class, E-3. They came to the course primarily from Army Airborne and Ranger units, both regular and reserve, but the classes also included men from Marine and Air Force units.

The Jumpmaster Training Course

As mentioned before, the Jumpmaster Course is one in which the Army trains officers and NCOs to assume the responsibility of preparing and supervising airdrops of personnel and equipment. This course provides a training environment in which the individual is expected to perform under stress, and the potential is there to take adequate experimental measures of both the performance and the stress. The performance measures come from the very detailed grading procedures of the course itself, which provide scores in terms of points lost for each aspect of an individual's performance while putting out equipment and jumpers over a drop zone. The measures of stress taken for this research were responses to questionnaire items probing the degree of stress students perceived themselves to be under during various events of the training.

The Jumpmaster Course Curriculum. The course is conducted over two full weeks of training. The first week is primarily one of classroom training and hands-on practice at rigging and inspecting various parachute harness arrangements. The second week begins with a day of a written, general knowledge examination and two hands-on parachute harness inspection examinations (called, collectively, the Jumpmaster Personnel Inspection Examination), and then consists, from the second day on, of flights and jumps over the drop zone.

There are five training jumps in the second week. First, there is both a day and a night orientation jump during which the students are taught to recognize under, first, daylight and then night-time conditions, the checkpoints on the ground indicating time and distance away from the drop zone. Every student makes a parachute jump at the conclusion of each of those orientation flights.

During the third flight, one member of each pair of students is graded while performing as a jumpmaster and, after going through a series of commands, inspections, and decisions about position of the aircraft relative to the drop zone, he "puts out the door" a heavy bundle of equipment (weighing approximately 200 lbs) as well as his partner who is used to represent a line or "stick" of jumpers. When both door bundle and jumper are gone, the Jumpmaster himself follows. This is the Door Bundle Jumpmaster (DBJM) Routine.

Later that day, after night falls, the class flies again and this time every man in the class wears combat equipment and is graded while performing as a Jumpmaster. For this routine there are no actual jumpers other than the Jumpmaster himself even though the student goes through his routine as though he were giving jump commands to other individuals. This is the Combat Equipment Jumpmaster Routine.

The final flight takes place the following day (weather permitting) when the remaining member of each team, the one who served merely as a jumper on the preceding day, is graded while acting as the Jumpmaster and he, then, puts out a door bundle, his partner who is now serving as a jumper, and himself.

Grading System for Performance in the Aircraft. Each student, as he goes through his routine serving in his turn as Jumpmaster, is closely attended by two members of the Jumpmaster cadre, one of whom grades his performance and the other records the result. Each student is given a cushion of 30 points out of a possible 100 which he may be penalized for errors in his performance and still pass the course. If, on any jump, he loses more than 30 points and his total score falls below 70, he fails and leaves the course immediately thereafter. Each of the important actions of the Jumpmaster routine is assigned specific numbers of points which are lost if the individual either forgets to perform them or performs them improperly. Points lost range from a single point assessed for a weak or late performance of non-critical actions, such as being one second late in getting the jumper away, to a maximum of 35 points for failure to perform actions of extreme importance such as hooking up the static line (which automatically deploys the main parachute)--a life-threatening error.

Procedure

Each class was met by the experimenter on inprocessing day and, at that time, its members were administered a background information questionnaire and a sports participation questionnaire (see below). Two weeks later, on graduation day, they were given a retrospective stress reaction questionnaire. The individuals who had failed the course prior to the end of training were

given the stress reaction questionnaire to be filled out and returned by mail; however, few did so. In addition, course grades for all students were recorded to be used as criterion variables for the investigation.

Background and Jump Experience Questionnaire. Information regarding the demographic and experiential background of each student was gathered with the Background and Jump Experience Questionnaire (see Appendix A). This form collected data on general demographic variables, such as age and years of education, as well as variables specific to the military, such as rank and number of service schools attended. In addition, it asked about experiential variables specific to airborne training and operations, such as number and type of parachute jumps and motivation for and prior knowledge about Jumpmaster training.

Sports Participation Questionnaire. This form was designed to measure both the extent and the quality of participation in various sports, including team sports such as football and basketball, individual sports such as track and boxing, and high-risk sports such as skydiving and mountaineering (see Appendix B).

Since it was not known prior to this study what might be the most important dimension describing participation in those sports, there were three sections included in the questionnaire. The first asked the respondents to rate the list of sports according to the extent of their participation in them during high school or since, where extent of participation was defined by the scale below:

Do Not Participate	Unorganized Participation with Friends or by Self	Organized Club	Intramural or Organized, Non-School League	High School Team	College Team
1	2	3	4	5	6

A second section asked for ratings according to amount of time during the normal season of each sport that the individual devoted to it and these judgments were made by selecting from the following scale:

Do Not Participate	Less Than 3 Hours/ Week	3-8 Hours/ Week	9-14 Hours/ Week	15-20 Hours/ Week	More Than 20 Hours/ Week
1	2	3	4	5	6

A third section asked the respondents to rate their participation in the list of sports by comparing the level of competence of their performance in each sport to what they would consider to be the average level of amateur competence in that sport. Choices for this dimension are displayed below:

Do Not Participate	Poor	Below Average	Average	Above Average	Expert
1	2	3	4	5	6

Stress Reaction Questionnaire. One variable of special interest in the prediction of how well men will function in a presumably stressful training and performance environment is amount of stress actually experienced. This variable is, at its heart, a matter of perception-- the perception by the individual of imminent harm or danger either to the physical self or to his hopes or his reputation. The Jumpmaster Course is one in which both of those dimensions of stress, harm anxiety and failure anxiety (Basowitz at al, 1955), can be felt by individuals undergoing the training. It was of interest, therefore, to gauge the amount of stress each individual perceived himself to be under during the various hallmark events of the Jumpmaster Course, and all those events were included in the Stress Reaction Questionnaire (see Appendix C) to be rated in accordance with the following scale:

Not Stressful At All	Borderline	Slightly Stressful	Moderately Stressful	Considerably Stressful	Extremely Stressful
1	2	3	4	5	6

The activities of the course which were listed on the questionnaire ranged from relatively low stress events such as parachute jumps at the end of the orientation flights, to what were presumably the most stressful events of the course, the graded performances as the Door Bundle Jumpmaster and the Combat Equipment Jumpmaster.

In addition, the students were asked to rate the relative stressfulness of various psychological aspects of going through the course such as thoughts of becoming rattled under pressure and making foolish mistakes or of coming to physical harm during a jump.

The data taken for this research were analyzed with the multivariate analysis Multiple Regression from the SPSS library of computer programs (Nie et at., 1975). This procedure was chosen because it enables the investigator to study the combined influence of a set of predictor variables on a criterion. The results of the analyses will be discussed in separate sections treating the relationships of particular predictor variables to specific criterion variables.

RESULTS AND DISCUSSION

Background Information, Prior Performance, Sports Participation, and Perceived Stress as Predictors of Performance in the Aircraft

As mentioned earlier, most of the stress in the Jumpmaster Course seems to center around the graded performances of the students in the aircraft while they actually engage in airdrops of personnel and equipment over a drop zone. It is during these performance routines that stress is most apparent in the faces of the students involved. Consequently, it was a matter of the greatest interest to see which of the candidate variables, among all those collected, would most strongly predict those performances.

The analyses to be reported here were a series of exploratory multiple regressions aimed at locating, from among the various distinct classes of variables from the different questionnaires, the most powerful variables in each set for predicting performance in the aircraft. The goal of these screening analyses was, first, to identify the most powerful variables of each set and then to run a final multiple regression using those variables as predictors of the total performance score in the aircraft.

Preliminary multiple regressions, using total score in the aircraft as the criterion variable, were performed with the following data sets:

1. Demographic and background variables -- age, education, number of service schools attended, and how much one had heard about the Jumpmaster Course prior to enrolling.

2. Airborne experience variables -- number and type of military jumps.

3. Sports participation variables -- each set of sports participation variables (team sports, individual sports, and high-risk sports) broken down further into separate sets by each dimension of the questionnaire (extent of participation, hours per week of involvement, and level of competence).

4. Perceived stress variables -- each set analyzed separately, the one gauging response to stressful events and, also, the one assessing stressful thoughts.

5. Prior performance variables -- scores from each event of the course for which grades were given prior to performance in the aircraft. These were the scores from the Written Examination covering technical knowledge about Jumpmaster activities and the score from the Jumpmaster Personnel Inspection (JPI) Examination.

These preliminary screening analyses by multiple regression served to test all variables within each theoretically distinct category against each other and, from them, the strongest variables from within each larger category (demographic, airborne experience, sports participation, etc.) were chosen for the final analysis.

Table 1 lists all the variables chosen in that manner and entered into the final analysis. Variables were selected for inclusion if they were either the strongest, or relatively strong predictors, from within a set of variables which, acting together, produced a significant prediction equation. If an entire variable set produced no significant regression equation the strongest predictor within that set was, nevertheless, also taken for the final analysis. This was done to see if those variables possess any predictive power at all of their own while in the company of the strongest variables from other sets.

An exception to the selection rule was made for the sports participation data sets, of which there were nine - three sets of different type sports for each of three dimensions of participation. Those variables, because they were designed to measure basically the same experiences in somewhat different ways, were undoubtedly redundant to a large extent. For that reason, only the ones that were included in sets of variables which were part of significant prediction equations were selected for the final analysis. Only the variables for the third dimension of sports participation, Level of Competence, were strong enough to qualify for inclusion under that criterion. Consequently, all sports included in the list in Table 1 were sports rated according to the level of competence of participants.

The resulting list of predictor variables, 19 in all, were put into a stepwise multiple regression analysis to predict the total score from the graded routines of the aircraft phase of the course. The analysis was performed after pairwise deletion of missing data. The variables were allowed to enter the regression each according to its strength in explaining the variance in the dependent variable. Since these analyses were exploratory in nature, the default values of the SPSS program were taken as the parameter levels to determine if variables were strong enough to be entered into the equation.

Table 1

MEANS, RANGES, AND STANDARD DEVIATIONS FOR BACKGROUND INFORMATION, PRIOR PERFORMANCE, PERCEIVED STRESS, AND SPORTS PARTICIPATION--LEVEL OF COMPETENCE--VARIABLES USED TO PREDICT POINT SCORES OF AIRCRAFT PHASE OF THE JUMPMASTER COURSE

Predictor Variable	Mean	Range	Standard Deviation	Number of Individuals
Demographic Background				
Age	25.208	19-59	5.935	96
Military Background				
Number of Jumps	52.188	5-501	62.958	96
Team Sports				
Football	3.854	1-6	1.265	96
Basketball	2.968	1-6	1.440	95
Softball	3.789	1-6	1.320	95
Individual Sports				
Track	3.104	1-6	1.670	96
Field	2.135	1-6	1.505	96
Cross Country	2.885	1-6	1.728	96
Swimming	3.684	1-6	1.363	95
Racquetball	2.531	1-6	1.549	96
Boxing	2.240	1-6	1.520	96
Karate	1.750	1-5	1.330	96
High-Risk Sports				
Skydiving	1.594	1-6	1.286	96
Skiing	2.563	1-6	1.601	96
Hang Gliding	1.128	1-5	.626	94
Stressful Events				
DBJM Stress	4.085	1-6	1.412	94
Stressful Thoughts				
Fail Stress	3.862	1-6	1.650	94
Prior Performance Scores				
JPI Total Score	172.763	130-200	16.465	97
Written Exam	87.577	70-100	6.916	97
Criterion Variable				
Aircraft, Total Score	82.454	67-100	8.110	97

The results of the analysis are displayed in Table 2. The variables listed there, acting in concert, predicted the performance score in the aircraft with a multiple R of 0.60. This represents a percentage of total variance explained (R^2) of 36%. This figure reduces to 32% (adjusted R^2) after being statistically adjusted by the SPSS Multiple Regression program to represent the shrinkage in predictive power to be expected when these variables, weighted by their associated B coefficients, are used to predict the performance scores of a new sample of students.

This analysis shows that perceived stress during the Door Bundle Jumpmaster Routine (DBJM Stress) was entered into the equation first as the variable in the set most highly correlated with performance. It explains approximately 15% of the variance in the performance scores. The second most powerful variable within the set was Age which explains an additional 7% of the variance. Next, after Age, was Number of Jumps, adding 4% to the proportion of variance explained. The remaining variables on the list were entered in the order listed and each one added a significant amount ($p<.05$) to the portion of variance explained in the criterion scores. The overall equation was significant beyond the .001 level.

Examination of the variable list will show that, while perceived stress during the Door Bundle Jumpmaster Routine, age of the student, and number of previous jumps explained most of the variance, they were substantially augmented by information regarding prior sports history. The two sports participation variables account for an increase of 10 percentage points in the portion of variance explained.

The simple r column of Table 2, which lists zero-order correlations, shows the strength and direction of the relationship between each predictor variable, taken by itself, and the criterion variable, Total Score in the Aircraft. It can be seen there that the three strongest variables in the multivariate relationship are negatively related to the criterion, indicating that as stress, age, and number of jumps increase, points scored in the aircraft decrease and vice versa. The remaining variables can be seen to relate to the criterion according to the signs they show in that column, with the team sport of softball being positively related to performance in the aircraft while the individual sport of track is negatively related.

It is also important to note, at this time, that only 97 of the original 128 enrollees in the course passed through the earlier tests of the course and were permitted to continue on to the aircraft phase. Thus, the 97 scores entered into this analysis represent a more restricted distribution than

Table 2

SUMMARY TABLE OF MULTIPLE REGRESSION ANALYSIS PREDICTING POINT SCORES OF AIRCRAFT PHASE OF JUMPMASTER COURSE FROM BEST PREDICTORS AMONG BACKGROUND, PERFORMANCE, STRESS, AND SPORTS PARTICIPATION--LEVEL OF COMPETENCE--VARIABLES

	Variable Entered	F to Enter	Significance	Multiple R	R Square	B Coefficients	Simple r	Overall F	Significance
1	DBJM Stress	15.293	.001	.38	.15	-2.237	-.38	15.293	<.001
2	Age	7.985	.026	.47	.22	-0.245	-.30	12.239	<.001
3	No. of Jumps	4.814	.010	.51	.26	-0.026	-.22	10.118	<.001
4	Softball	6.850	.003	.56	.31	1.687	.22	9.811	<.001
5	Track	6.059	.016	.60	.36	-1.074	-.16	9.523	<.001
						Constant 96.430			

would have been the case if the prior failures had been given a chance to perform. Consequently, prediction for this distribution of criterion scores is more difficult.

Background Information, Prior Performance, Sports Participation--Level of Competence, Minus Perceived Stress as Predictors of Performance in the Aircraft

The perceived stress variables, since they are retrospective measures of stress undergone during earlier events, must be regarded with some skepticism concerning their validity as measures of actual stress experienced. Their weakness, in the case of the events during which grades for performance were given, is that they are judgments about past events made while the tangible results of those events, in terms of points lost, are readily available in the memory of the individual and, therefore,could possibly influence the judgment he renders. Specifically, a man who loses many points might reflect on the experience and decide that he had been under great stress because he lost all those points. If that were the case then a strong relationship of the perceived stress variable to points lost would be a misleading outcome. Furthermore, since the perceived stress variables are retrospective measures, they cannot, in any utilitarian sense, actually be used to predict performance in the future (although psychological measures of stress tolerance might be developed to do so) since the performance is over and done with before the measures to predict it become available.

Given this set of circumstances, it was of interest to see what portion of the variance in the performance scores could be explained without including the stress variables in the analysis. Table 3 presents the results of a stepwise multiple regression with 97 subjects, using all the variables from Table 2 except the two perceived stress variables, DBJM and Fail Stress. In Table 3, it can be seen that the altered set of variables predicts performance in the aircraft with a multiple $R = 0.49$, $R^2 = 0.24$, $p < .001$. Statistically adjusted for shrinkage, $R^2 = 0.20$.

Thus, with the perceived stress variables removed from the analysis, considerable predictive power remains. Age then becomes the best predictor followed by level of competence in the sports of skiing, hang gliding, track, and football. With the removal of DBJM Stress, portions of the variance which had been explained by that variable were then taken up, in part, by the sports background predictors.

Sports Participation--Level of competence--Variables as Predictors of Performance in the Aircraft

To enquire further into the independent predictive power of the Level of Competence dimension of the Sports Participation Questionnaire, all the sports from that dimension (See Table 4) were used to predict the total score for performance in the aircraft. For that purpose, another multiple regression analysis was performed and the summary table for that analysis can be found in Table 5. There it can be seen that, with the inclusion of the sports variables from the strongest predictor, Football, to the weakest predictor, Skiing, the Level of Competence dimension predicted performance in the aircraft with a

Table 3

SUMMARY TABLE OF MULTIPLE REGRESSION ANALYSIS PREDICTING POINT SCORES OF AIRCRAFT PHASE OF JUMPMASTER COURSE FROM BEST PREDICTORS AMONG BACKGROUND, PERFORMANCE, AND SPORTS PARTICIPATION -- LEVEL OF COMPETENCE--VARIABLES

	Variable Entered	F to Enter	Significance	Multiple R	R Square	B Coefficients	Simple r	Overall F	Significance
1	Age	9.298	.013	.30	.09	-0.300	-.30	9.298	.003
2	Skiing	4.287	.009	.36	.13	1.333	.21	6.959	.002
3	Hang Gliding	3.992	.044	.41	.17	-2.964	-.11	6.122	.001
4	Track	3.570	.023	.45	.20	-1.084	-.16	5.615	.001
5	Football	4.252	.042	.49	.24	1.282	.25	5.507	.001
						Constant 88.678			

Table 4

MEANS, RANGES, AND STANDARD DEVIATIONS FOR SPORTS PARTICIPATION--LEVEL OF COMPETENCE--VARIABLES USED TO PREDICT POINT SCORES OF AIRCRAFT PHASE OF THE JUMPMASTER COURSE

Predictor Variable	Mean	Range	Standard Deviation	Number of Individuals
Team Sports				
Football	3.854	1-6	1.265	96
Baseball	3.625	1-6	1.355	96
Basketball	2.968	1-6	1.440	95
Softball	3.789	1-6	1.320	95
Soccer	2.427	1-6	1.485	96
Rugby	1.656	1-6	1.288	96
Individual Sports				
Track	3.104	1-6	1.670	96
Field	2.135	1-6	1.505	96
Cross-country	2.885	1-6	1.728	96
Swimming	3.684	1-6	1.363	95
Tennis	2.615	1-6	1.432	96
Racquetball	2.531	1-6	1.549	96
Squash	1.305	1-6	0.888	95
Handball	1.958	1-6	1.328	95
Boxing	2.240	1-6	1.520	96
Wrestling	2.635	1-6	1.705	96
Karate	1.750	1-5	1.330	96
Judo	1.500	1-6	1.152	96
High-Risk Sports				
Scuba Diving	1.781	1-6	1.488	96
Skydiving	1.594	1-6	1.286	96
Mountaineering	3.031	1-6	1.625	96
Skiing	2.562	1-6	1.601	96
Hang Gliding	1.128	1-5	0.626	94
Criterion Variable				
Aircraft, Total Score	82.454	67-100	8.110	97

Table 5

SUMMARY TABLE OF MULTIPLE REGRESSION ANALYSIS PREDICTING POINT SCORES OF AIRCRAFT PHASE OF JUMPMASTER COURSE FROM LEVEL OF COMPETENCE IN PRIOR SPORTS PARTICIPATION

	Variable Entered	F to Enter	Significance	Multiple R	R Square	B Coefficients	Simple r	Overall F	Significance
1	Football	5.988	.008	.25	.06	1.710	.25	5.988	.016
2	Track	4.805	.018	.33	.11	-1.174	-.16	5.520	.005
3	Skiing	4.460	.037	.39	.15	1.058	.21	5.306	.002
						Constant 76.962			

multiple R = 0.39 and an R^2 =0.15, p =0.002. Statistically adjusted for shrinkage, R^2= .12.

Reference to the simple r column of Table 5 will once again allow determination of the direction of the relationship of each individual sport and the criterion, Total Score in the Aircraft. The variables Football and Skiing are positively related to the criterion, indicating that, as level of competence in those sports increases, points scored in the aircraft also increase. Track, on the other hand, is negatively related to the criterion, and as level of competence in track goes up there is a slight tendency for points scored to go down.

GENERAL DISCUSSION

The results of this research indicate that there is considerable predictive power in some of the variable sets chosen for this research. Variables important to the explanation and eventual prediction of performance in the aircraft in Jumpmaster training come from most of the sets explored--demographic variables, airborne experience variables, perceived stress variables, and sports participation variables from the team, individual, and high-risk sports categories.

Performance under Stress

The strength of the DBJM Stress variable (assuming its validity) as a predictor of performance in the aircraft indicates that some students, at least, consider that experience to be a stressful one, and that the amount of stress reported by individuals for the experience is related to the quality of their performances. These results add some objective weight to the subjective evaluations of observers who can see that many individuals obviously are very apprehensive prior to performing their routines in the aircraft. Conversations with the students both before and after the events bear this out.

Each of the equations developed in the foregoing analyses to predict the total point scores for these stressful performances in the aircraft explained significant and substantial portions of the variability in these scores. The equation which was developed from the set of "best predictor" variables explained the largest proportion of the variance in the scores. However, since the strongest variable in that equation was DBJM Stress, one of the perceived stress variables whose validity is uncertain at this point, other equations were developed excluding those variables and testing the remainder. Even the weakest of these equations, however, the one using the Level of Competence dimension of prior sports participation, explained 12% of the variance in the criterion scores, a not inconsequential proportion of the variance, considering the ease with which the information can be collected.

It should be recalled at this point that many of the students who had initially enrolled in the course had already failed out prior to the aircraft phase. This means that those who made it that far were already a select group among whom discrimination would be more difficult than if all students who began the course had been tested in the air prior to being dropped as failures.

Perceived Stress as a Predictor

The strongest individual variable in the relationships studied was, quite clearly, the perceived stress measure for the Door Bundle Jumpmaster Routine which was the best predictor in each analysis in which it was entered. None of the other variables from the Stress Reaction Questionnaire showed the same strength as that measure but this is probably due to the fact that the other measures shared a large amount of variance with the DBJM Stress variable and, once it was chosen in any analysis, the other variables became redundant and did not enter the equation.

Although it has been used in this research to explain part of the variance in performance, the DBJM Stress variable is a retrospective account of stress experienced during a critical event of jumpmaster training and, thus, could never be used as a prospective predictor variable for selection of students. However, it is conceivable that tests for stress tolerance, either psychological or physiological, that are prospective in nature, could be developed and used for selection purposes. Since the data presented here have identified perceived stress as a strong predictor of performance, a line of research, focusing on Jumpmaster training, to develop and refine instruments predictive of susceptibility to stress might be pursued with profit.

Age and Jump Experience as Predictors

Next in strength, after the stress variable, was the demographic variable of Age, which was strong in each analysis in which it appeared, and then the airborne experience variable of Number of Jumps. The interesting feature of the contributions of these variables is that they are both negatively related to performance in the aircraft--as both age and number of jumps increase, points scored in the aircraft goes down. This indicates that, not only increasing age, but also increasing experience with parachuting in some way interferes with an individual's performance. Since both these variables appear early in the same analysis, they are explaining independent portions of the variance. This means that although the two variables are weakly related ($r = 0.11$) it is not simply the case that, as an individual in the airborne gets older, he also has made more parachute jumps; therefore, it is his age that explains the predictive strength of both variables.

Sports Participation Predictors

The remaining variables that made significant contributions to the prediction were those from the Level of Competence dimension of the Sports Participation Questionnaire. Competences at sports from each grouping (team, individual, and high risk) were found to be good predictors.

The strength of individual sports participation predictors changed as a function of the variable set used in each analysis. When the perceived stress, age, and number of jumps variables were in the analysis, the team sport, softball, and the individual sport, track, were significant predictors. When the stress variable was removed, the strongest variable, Age, was joined in the equation by the two high-risk sports of skiing and hang gliding, the individual sport of track, and the team sport of football. Against the new variable background, the high-risk sports apparently picked up some of the variance previously associated with DBJM Stress, Track was maintained as a predictor from the individual sports category, and Football replaced Softball as the team sport predictor. It would appear from this change that elements of the total variance that Football shares with both DBJM Stress and Softball comes to the fore when the stress variable is eliminated, thus making Football a significant predictor and softball superfluous.

When only the level of competence variables were used to predict performance, Football was the strongest variable of the set with Track and Skiing, once again, included. This result indicates that a profile of competence in sports spanning all three categories defined in this research--team, individual, and high-risk sports--is useful in predicting performance in the aircraft.

These relationships may mean that skills or attitudes that were developed while participating in the various sports lead to successful performance in stressful events of the Jumpmaster Course. An alternate possibility is that pre-existing skills or attitudes, which led to choice of participating in the various sports in the first place, are the factors related to success in Jumpmaster training. Until further research can be performed to clarify the influence of sports participation on performance under stress, it is best to regard these variables as a unit which produces an overall profile or composite of an individual's sports history rather than to try to puzzle out the developmental influence of particular sports experiences as expressed in each of the separate analyses. At this time, it needs only to be pointed out that competence in some sports is associated with relatively high levels of performance whereas participation in others is associated with lower levels of performance. Whatever the nature and effect of these background experiences may be, they are correlated with the ability to perform in stressful circumstances and will predict it in a useful way.

Problems with the Research

The results of this research should be considered to be tentative. Most multivariate statistical analyses, capitalizing as they do on chance associations, require high subject-to-variable ratios, full replication, and cross-validation to firmly establish the validity and utility of their outcomes. To insure that the results obtained here are real and are reliable, the prediction equations using the B coefficients in the tables should be tested on another sample of Jumpmaster students of at least an equivalent number of individuals.

This research had been planned to continue on to include an additional four classes of Jumpmaster students. These classes would have served as a cross-validation sample to test the predictions developed in the analyses described in this report. However, a shortage of cadre for the Basic Airborne Course at Fort Benning and the need to divert cadre to it required a prolonged and indefinite termination of the Jumpmaster Course soon after the last class used in this research was graduated. There are, at present, no plans to resume regular classes prior to mid-1981.

Each of these equations with its associated proportion of variance explained has been statistically adjusted to account for the amount of shrinkage in predictive power to be expected when using these same variables to predict for a new sample. Nevertheless, those adjusted estimates are probably not conservative enough to be completely reliable. The adjusted R^2's reported in the results section of this paper were based on the number of variables entered into each particular analysis. A more conservative recommendation holds that the estimate of shrinkage should be obtained by entering the total number of variables defined within a given research project

into the shrinkage formula (Cohen and Cohen, 1975, p. 107). Due to the exploratory nature of this study in which there were a larger number of variables sifted for potential use as predictors than there were subjects in the experiment, this formula is overly restrictive and was not used.

The Sports Participation Questionnaire

Considering the amount of prediction of performance under stress in the Jumpmaster Course that can be obtained with this quickly administered and inexpensive questionnaire, it would seem that further research to validate the Sports Participation Questionnaire would be warranted. The analyses reported here have indicated that only the last section of the questionnaire, the Level of Competence dimension, should be retained and the list of sports included therein could be shortened considerably. If, as it appears, this brief questionnaire can tap into general dimensions of ability or motivation to perform under stress, it could ultimately be of use in any selection program aimed at identifying men for hazardous duty.

REFERENCES

Basowitz, H., Persky, H., Korchin, S.J., Grinker, R. Anxiety and stress: An interdisciplinary study of a life situation. New York: McGraw-Hill Book Co., Inc. 1955.

Berkhouse, R.G. Research on combat selection and Special Forces manpower problems: Status report. (Res. study 63-2) Department of the Army: US Army Personnel Research Office, January, 1963.

Berkun, M.M., Bialek, H.M., Kern, R.P. and Yagi, K. Experimental studies of psychological stress in man. Psychological Monographs, 1962, 76 (15, Whole No. 534).

Cohen, P. & Cohen, J. Applied multiple regression/correlation analysis for the behavioral sciencies. New York: John Wiley & Sons, 1975.

Edgerton, H.A. and Graham, W.R. The identification of observable factors related to success in combat or simulated combat: Final report. (PRS Report 918) Department of the Army: Personnel Research Section, December, 1951.

Egbert, R.L., Meeland, T., Cline, V.B., Forgy, E.W., Spickler, M.W. and Brown, C. Fighter I: A study of effective and ineffective combat performers. (HumRRO Spec. Rep. 13), March, 1958. (AD-158 581).

Klecka, W.R. Discriminant analysis. In Nie, N.H.; Hull, C.H.; Jenkins, J.G.; Steinbrenner, K.; Bent, D.H. (Eds.), SPSS: Statistical package for the social sciences (2nd Ed.). New York: McGraw-Hill, 1975.

Mulcahy, P.D. Finding the fighters. Army, June, 1957. pp. 21-24.

Nie, N.H.; Hull, C.H.; Jenkins, J.G.; Steinbrenner, K.; Bent, D.H. (Eds.), SPSS: Statistical package for the social sciences (2nd Ed.). New York: McGraw-Hill, 1975.

Olmstead, J.A., Caviness, J.A., Powers, T.R., Maxey, J.L. and Cleary, F.K. Selection and training for small independent action forces: Final report. (HumRRO Tech. Rep. 72-2). Alexandria, VA.: Human Resources Research Organization, February, 1972.

OSS Assessment Staff: Assessment of men. Scranton, PA: Rinehart & Co., Inc., 1948.

APPENDIX A

Background and Jump Experience Questionnaire

		Col
CARD #1		1
CLASS #_____		2-3
1. NAME _____ (Last) (First) (Middle)		4-11
2. SSN_____		12-20
3. AGE_____		21-22
4. GRADE	0_____1 1_____1	23-24
	E_____2 2_____2	
	W_____3 3_____3	
	4_____4	
	5_____5	
	6_____6	
	7_____7	
	8_____8	
5. Education, number of completed years (High School GED is equal to 12 years) _____		25-26
6. Unit of origin_____ _____		27-29
7. Unit to which assigned after jumpmaster school _____ _____		30-32
8. Number of previous jumps:	military _____	33-35
	sport or civilian _____	36-38

Col

9. Number of tactical jumps _____ 39-41

10. Number of mass tactical jumps _____ 42-44

Number of night jumps _____ 45-47

11. Number of months on jump status _____ 48-50

12. Have you received pre-jumpmaster training at your unit

Yes_____1 51

No _____2

13. How much have you heard about the training and requirements of jumpmaster school

Little_____1

Some _____2

Much _____3 52

14. Did you volunteer for jumpmaster school

Yes_____1 53

No _____2

15. Did you <u>want</u> to volunteer for jumpmaster school

Yes_____1 54

No _____2

16. Have you served in combat Yes_____1 No_____2 55

17. How many service schools (OCS, ANCOC, Ranger, Special Forces, etc.) have you successfully completed since you entered the Army _____ 56-57
Please list them on the back of the page

APPENDIX B

Sports Participation Questionnaire

	Col
Card #2	1
Class #_____	2-3
Name _____ (Last) (First) (Middle)	4-11
SSN _____	12-20

Using the numbered scale listed below, rate the following list of sports according to the extent of your participation in them during High School or since.

1 Do not participate
2 Unorganized participation with friends or by self
3 Organized club
4 Intramural or organized, non-school, league
5 High School team
6 College team

	GROUP I		
1	Football	1 2 3 4 5 6	21
2	Baseball	1 2 3 4 5 6	22
3	Basketball	1 2 3 4 5 6	23
4	Softball	1 2 3 4 5 6	24
5	Soccer	1 2 3 4 5 6	25
6	Rugby	1 2 3 4 5 6	26
	GROUP II		
7	Track	1 2 3 4 5 6	27
8	Field	1 2 3 4 5 6	28
9	Cross Country or Marathon	1 2 3 4 5 6	29
10	Swimming	1 2 3 4 5 6	30
11	Tennis	1 2 3 4 5 6	31
12	Racquetball	1 2 3 4 5 6	32
13	Squash	1 2 3 4 5 6	33

			Col
	GROUP II (Cont'd)		
14	Handball	1 2 3 4 5 6	34
15	Boxing	1 2 3 4 5 6	35
16	Wrestling	1 2 3 4 5 6	36
17	Karate	1 2 3 4 5 6	37
18	Judo	1 2 3 4 5 6	38
	GROUP III		
19	Scuba Diving	1 2 3 4 5 6	39
20	Sky Diving	1 2 3 4 5 6	40
21	Mountaineering	1 2 3 4 5 6	41
22	Skiing	1 2 3 4 5 6	42
23	Hang Gliding	1 2 3 4 5 6	43
24	Other (please name) _____	1 2 3 4 5 6	44
25	Other (please name) _____	1 2 3 4 5 6	45
26	Other (please name) _____	1 2 3 4 5 6	46

Col

Card #2 1

Class #_____ 2-3

Name _____ 4-11
(Last) (First) (Middle)

SSN _____ 12-20

Using the numbered scale listed below, rate the following list of sports according to the amount of time during the normal season of each sport that you spend on it each week.

1 Do not participate
2 Less than 3 hours/week
3 3-8 hours/week
4 9-14 hours/week
5 15-20 hours/week
6 More than 20 hours/week

GROUP I

1	Football	1	2	3	4	5	6	21
2	Baseball	1	2	3	4	5	6	22
3	Basketball	1	2	3	4	5	6	23
4	Softball	1	2	3	4	5	6	24
5	Soccer	1	2	3	4	5	6	25
6	Rugby	1	2	3	4	5	6	26

GROUP II

7	Track	1	2	3	4	5	6	27
8	Field	1	2	3	4	5	6	28
9	Cross Country or Marathon	1	2	3	4	5	6	29
10	Swimming	1	2	3	4	5	6	30
11	Tennis	1	2	3	4	5	6	31
12	Racquetball	1	2	3	4	5	6	32
13	Squash	1	2	3	4	5	6	33

	GROUP II (Cont'd)		Col
14	Handball	1 2 3 4 5 6	34
15	Boxing	1 2 3 4 5 6	35
16	Wrestling	1 2 3 4 5 6	36
17	Karate	1 2 3 4 5 6	37
18	Judo	1 2 3 4 5 6	38
	GROUP III		
19	Scuba Diving	1 2 3 4 5 6	39
20	Sky Diving	1 2 3 4 5 6	40
21	Mountaineering	1 2 3 4 5 6	41
22	Skiing	1 2 3 4 5 6	42
23	Hang Gliding	1 2 3 4 5 6	43
24	Other (please name) _____	1 2 3 4 5 6	44
25	Other (please name) _____	1 2 3 4 5 6	45
26	Other (please name) _____	1 2 3 4 5 6	46

	Col
Card #2	1
Class #_____	2-3
Name _____ (Last) (First) (Middle)	4-11
SSN _____	12-20

Using the numbered scale listed below, rate the following list of sports by comparing the level of your performance in each sport to what you would consider to be the average level of amateur competence in that sport.

1 Do not participate
2 Poor
3 Below average
4 Average
5 Above average
6 Expert

GROUP I

1	Football	1 2 3 4 5 6	21
2	Baseball	1 2 3 4 5 6	22
3	Basketball	1 2 3 4 5 6	23
4	Softball	1 2 3 4 5 6	24
5	Soccer	1 2 3 4 5 6	25
6	Rugby	1 2 3 4 5 6	26

GROUP II

7	Track	1 2 3 4 5 6	27
8	Field	1 2 3 4 5 6	28
9	Cross Country & Marathon	1 2 3 4 5 6	29
10	Swimming	1 2 3 4 5 6	30
11	Tennis	1 2 3 4 5 6	31
12	Racquetball	1 2 3 4 5 6	32
13	Squash	1 2 3 4 5 6	33

	GROUP II (Cont'd)		Col
14	Handball	1 2 3 4 5 6	34
15	Boxing	1 2 3 4 5 6	35
16	Wrestling	1 2 3 4 5 6	36
17	Karate	1 2 3 4 5 6	37
18	Judo	1 2 3 4 5 6	38
	GROUP III		
19	Scuba Diving	1 2 3 4 5 6	39
20	Sky Diving	1 2 3 4 5 6	40
21	Mountaineering	1 2 3 4 5 6	41
22	Skiing	1 2 3 4 5 6	42
23	Hang Gliding	1 2 3 4 5 6	43
24	Other (please name) _____	1 2 3 4 5 6	44
25	Other (please name) _____	1 2 3 4 5 6	45
26	Other (please name) _____	1 2 3 4 5 6	46

APPENDIX C

Stress Reaction Questionnaire

Col

CARD #3 1

CLASS #_____ 2-3

NAME_____ 4-11
(Last) (First) (Middle)

SSN_____ 12-20

Using the numbered scale listed below, rate the following list of items according to how stressful each of them was for you during Jumpmaster Training.

1 Not stressful at all
2 Borderline
3 Slightly stressful
4 Moderately stressful
5 Considerably stressful
6 Extremely stressful

GROUP I

1	Mock tower jump with CWIE	1	2	3	4	5	6	21
2	Jumpmaster Personnel Inspection Exam	1	2	3	4	5	6	22
3	Written Exam	1	2	3	4	5	6	23
4	Helicopter Jump	1	2	3	4	5	6	24
5	Day orientation jump	1	2	3	4	5	6	25
6	Night orientation jump	1	2	3	4	5	6	26
7	Daylight jump as door bundle jumpmaster	1	2	3	4	5	6	27
8	Daylight jump as CWIE jumper	1	2	3	4	5	6	28
9	Night jump as combat equipment jumpmaster	1	2	3	4	5	6	29
10	Night jump as combat equipment jumper	1	2	3	4	5	6	30

GROUP II

11	Thoughts of becoming rattled under pressure and making foolish mistakes	1	2	3	4	5	6	31
12	Thoughts of failing the course	1	2	3	4	5	6	32
13	Thoughts of disappointing friends or superiors in your home unit	1	2	3	4	5	6	33
14	Thoughts of parachute malfunction	1	2	3	4	5	6	34
15	Thoughts of being injured during jumps	1	2	3	4	5	6	35
16	Thoughts of being killed during jumps	1	2	3	4	5	6	36